

Please amend the third whole paragraph on page 2 of the specification to read as follows:

92 --The prior art also includes isolated two-wave mixers as well as isolated double-pumped phase-conjugate mirrors, both used as real-time beam clean-up (or wavefront matching) elements; these systems degrade in performance in the case of large-amplitude phase excursions, since the real-time grating can experience erasure.--

Please amend the first whole paragraph on page 3 of the specification to read as follows:

93 --The present invention overcomes all these limitations, by integrating a high-performance adaptive optical combined element, with a multi-spatial-mode fiber delay line. Moreover, by using a pair of such delay lines, a short-coherence length source can be used; the prior art in this respect involves a photo-emf sensor, which is integrated with the dual-fiber delay line (see Figure 3). Therefore, the net system is limited in detection bandwidth. Finally, the multi-mode optical fiber delay line can be in the form of an amplifying multi-mode optical fiber (e.g., Er-doped glass), for added gain. The present invention will provide robust sensors which can perform in a variety of adverse industrial conditions, including the use of short-coherence sources, extreme (i.e., many optical wavelengths of) workpiece wobbling and beam wander, low-reflectivity workpieces (e.g., or other propagation path losses), and laser amplitude fluctuations (due to workpiece reflectivity changes, wobbling, etc.). The present invention also provides robust sensors for remote sensing and laser communications applications in which the sensor must tolerate fluctuations in received intensity levels.”--

Please amend the last whole paragraph on page 3 of the specification to read as follows:

94 --Briefly, and in general terms, the present invention provides an optical apparatus for coherent detection of an input optical beam. The apparatus includes a beam splitter for splitting the input optical beam into a first component and a second component; an optical delay device arranged to receive the second component, the optical delay device imposing an intentional delay in the second component of the input optical beam; and an adaptive beam combiner coupled to

94 receive the second component with a delay imposed thereon by the optical delay device; and the first component from the beam splitter. The adaptive beam combiner has two exiting components which have the same wavefronts and propagating directions as the first and second components and which are in quadrature. A detector arrangement is provided for receiving and detecting the first and second exiting components from the adaptive beam combiner.--

Please amend the second whole paragraph on page 5 of the specification to read as follows:

95 --In a third embodiment, which will be described with reference to Figure 4, the optical source 19 is not provided by laser 18 (which can be omitted), but rather the optical source 19 might be a transmitter of an optical communication system for transmitting data optically. Of course, a suitable laser would likely be used as a component of the optical communications system transmitter.--

Please amend the paragraph bridging pages 5 and 6 of the specification to read as follows:

96 --The first embodiment of the invention will be described in connection with a system and method for detecting ultrasound using time-delay interferometry. However, the invention is not limited to this application as it can also be utilized in other applications, such as communication systems, for example.--

Please amend the paragraph bridging pages 6 and 7 of the specification to read as follows:

97 --When reflected from the surface 16, the probe beam is phase modulated by the vibrations induced on the readout surface 16 by the ultrasound 12. The surface 16 is assumed to be smooth enough so that the reflected probe beam 46 substantially maintains its circular polarization. The reflected probe beam 46 passes back through lenses 44, 40 and 38, and also back through quarter-wave plate 42, which converts this circular polarization back to a linear polarization that is orthogonal to the probe beam's initial linear polarization state as it exited PBS 36. Since the polarization of the reflected beam is now rotated, this rotation allows the reflected